it is appreciated that the spring **32** could also be electrically coupled with the controller **24** and the mid-stroke position of the spring **32** determined by the stress, strain, and/or deformation of the coil spring **32**.

[0058] In another embodiment shown in FIG. **5**, both the portion of the load **12** and element **14** are disposed within a sheath **36** filled with a compressible fluid **38** (e.g., air). The load **12** sealably engages the interior surface of the sheath **36**, so as to create first and second compartments, and is able to translate therein. Upon activation of the element **14**, the load **12** is caused to translate within the sheath **36**, so as to reduce the volume of one of the compartments. By doing so, the pressure of the fluid **38** housed therein is increased under Boyle's law; and the mechanical resistance to motion is increased. The sheath **36** defines at least one set of lateral orifices **36***a* that present a total available outlet size. As the portion of the load **12** translates, and reaches a set of orifices **36***a*, the mechanical resistance to motion caused by the compression and forcing out of separate quantities of the fluid **38** undergoes a spike. That is to say, at such points, the stress induced within the element **14** will be caused to undergo a rapid change, because of the sudden reduction in the available outlet size. Each set of orifices **36***a* corresponds to a mid-stroke position to be determined.

[0059] In the second aspect of the invention, a mid-stroke position is determinable by selectively engaging an ancillary circuit **16** that is positioned adjacent the path with the portion of the load **12** (FIGS. **6-9**). In FIG. **6**, for example, the portion of the load **12** includes first and second electrical contacts **40**, and the ancillary circuit **16** includes first and second leads **42** that are configured and positioned to selectively engage the contacts **40**, when the load **12** is at the mid-stroke position. The preferred circuit **16** further includes a monitoring device **44** operable to determine or alert a user to whether the circuit **16** is open or closed. It is appreciated that multiple sets of leads **42** may be used to determine multiple mid-stroke positions, and therefore, that at least one monitoring device **44** may be configured to variably determine and/or alert the user dependent upon the engaged set of leads **42**.

[0060] Another example is shown in FIG. **7**, wherein the system **10** is configured similar to the configuration shown in FIG. **4**, except that the mechanical resistance wheel **34** is replaced by a turning switch **46** composing the circuit **16**. As the switch **46** engages the coils **32***a* of the spring **32**, the circuit **16** is toggled between open and closed conditions, corresponding to mid-stroke positions. Again, by closing the circuit **16**, a desirous outcome is achieved that alerts the user to the load achieving the mid-stroke position.

[0061] In another example shown in FIG. **8**, the portion of a load **12** defines a plurality of holes **12***a* (shown in hidden-line type), and is caused to traverse a photo-interrupter **48** composing the circuit **16**, and operable to generate and absorb light or radiation **48***a* generated for example by an infrared LED. More particularly, the portion **12** is configured such that the holes **12***a* are caused to intermittently receive the light **48***a* as the load **12** translates. When the light **48***a* is interrupted, the circuit **16** is open; when the light **48***a* is uninterrupted (i.e., passes through one of the holes **12***a*), the circuit **16** is closed. The hole positions correspond to the pre-determined mid-stroke positions. Since the photo-interrupter **48** is normally closed, it is appreciated that determination of a mid-stroke position may be based on a toggle of the interrupter rather than an absolute condition. As shown in FIG. **9**, it is appreciated that the photo-interrupter **48** may be replaced by a photo-transistor **50**, which functions similarly but utilizes ambient light. It is appreciated, however, that photo-transistors typically present significantly longer response times.

[0062] In plural mid-stroke position embodiments, the controller **24** preferably includes a counter that tracks the number of rapid changes in electrical resistance or modifications to the circuit **16**, so as to determine the actual position of the load **12**. The counter may count actual rapid changes/circuit modifications, or toggles of the same.

[0063] This written description uses examples to disclose the invention, including the best mode, and also to enable any person skilled in the art to make and use the invention. The patentable scope of the invention is defined by the claims, and may include other examples that occur to those skilled in the art. Such other examples are intended to be within the scope of the claims if they have structural elements that do not differ from the literal language of the claims, or if they include equivalent structural elements with insubstantial differences from the literal languages of the claims. Also, as used herein, the terms "first", "second", and the like do not denote any order or importance, but rather are used to distinguish one element from another, and the terms "the", "a", and "an" do not denote a limitation of quantity, but rather denote the presence of at least one of the referenced item. All ranges directed to the same quantity of a given component or measurement is inclusive of the endpoints and independently combinable.

[0064] Suitable algorithms, processing capability, and sensor inputs are well within the skill of those in the art in view of this disclosure. This invention has been described with reference to exemplary embodiments; it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the invention. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the invention without departing from the essential scope thereof. Therefore, it is intended that the invention not be limited to a particular embodiment disclosed as the best mode contemplated for carrying out this invention, but that the invention will include all embodiments falling within the scope of the appended claims.

What is claimed is:

1. A method of determining at least one mid-stroke position of a load driven by an active material element, said method comprising:

a) drivenly coupling the load with an active material element operable to undergo a reversible change in fundamental property when exposed to or occluded from an activation signal, such that the element is operable to translate the load between first and second positions when the element undergoes the change, so as to define a stroke;

b) exposing the element to or occluding the element from the activation signal, so as to cause the change;

c) measuring an electrical resistance of the element throughout the stroke;

d) inducing or reducing a stress in the element when the load is at said at least one mid-stroke position, so as to cause an increase or decrease in the electrical resistance; and

e) determining the increase or decrease in electrical resistance.